
MEMORANDUM

TO: Keith Noyes, DPW, Town of Hampton, NH

FROM: Philip A. Corbett, P.E. CMA Engineers, Inc.

RE: Exeter Road Reconstruction
Preliminary Design – Executive Summary
CMA #884

DATE: September 4, 2014

This Memorandum summarizes CMA Engineer's evaluation and preliminary design of Exeter Road, as reviewed with you and other representatives of Hampton Public Works Department. The project area includes approximately 1.3 miles of Exeter Road between NH 101 and Lafayette Road. The purpose of the project is to:

- Improve serviceability and safety
- Address drainage and maintenance issues
- Improve public mobility: vehicles, pedestrians & bicycles
- Rehabilitate pavement
- Incorporate necessary utility improvements
- Enhance "gateway" characteristics

To evaluate the roadway and develop the preliminary design, we analyzed existing conditions and gathered information including:

- A field review and field survey
- Cores of the roadway pavement and subsurface borings of the base gravels and subgrade
- Public meeting input
- Video inspection of the sewer main
- Concept development and coordination with Hampton staff
- Cost estimates of alternative scenarios.



Existing pavement is in poor condition & the roadway has insufficient drainage

Based on our analysis of the existing conditions, we evaluated roadway rehabilitation and reconstruction options. The field review and pavement cores confirmed the pavement is in poor condition, with cracking, de-lamination and utility trench patches. Rehabilitation of pavement (pavement overlays or in-place reclamation) will not provide long-term cost effective serviceability. The roadway should be reconstructed with a new gravel base foundation and a

new pavement section. To properly reconstruct the road, the pavement, base gravels, and 2 feet +/- of subgrade should be removed and replaced ("full box" reconstruction).

To reduce material costs for roadway reconstruction, we recommend salvaging and reusing the existing roadway materials (pavement and gravels) to the extent practical. Based on the on the subsurface borings, the existing gravel within the center 18 – 20 foot section of the road is of suitable quality to reuse. Because the gravel thickness and quality is inconsistent throughout the length and section of the road and the roadway needs to be reshaped and graded, these materials must be removed and stockpiled for reuse. To salvage and reuse the pavement, it can be reclaimed (pulverized) into the existing base gravels, which will help fortify the gravel material.

For the best long-term cost effective serviceability, we recommend the following reconstruction approach:

- Reclaim the asphalt into the existing base gravels
- Excavate this material to a stockpile for reuse
- Excavate an additional 2 feet +/- of the subgrade
- Import the reclaimed material and supplemental gravel
- Install new pavement (5 to 6 inches deep) over the gravel surface.

In addition to an inadequate gravel foundation, the pavement is in poor condition because there is insufficient drainage conveyance and collection in the roadway. Drainage problems were very apparent during field reviews and were one of the biggest complaints from residents. Drainage issues must be addressed or the roadway will deteriorate rapidly, even if reconstructed as proposed.

To improve drainage conveyance, the preliminary design includes re-establishing the roadway crown (cross-slope), minor adjustments to the roadway profile (longitudinal slope), and significant additional curbing. Re-establishing the roadway crown will shed water off the road and proposed adjustments to the profile in flat areas will better convey stormwater to drainage catch basins. The proposed vertical granite curb will capture and contain stormwater runoff and help direct it to catch basins. To improve drainage collection, the preliminary design includes significant additional closed drainage (catch basins and drain pipes). The closed drainage infrastructure adds substantial project costs but must be done to resolve chronic drainage issues and provide long term serviceability.



The preliminary design has identified potential areas to accommodate water quality features, but specific treatments will be designed in the final design phase.

In addition to the roadway surface/pavement conditions and drainage problems, several other issues came out of the design development process including:

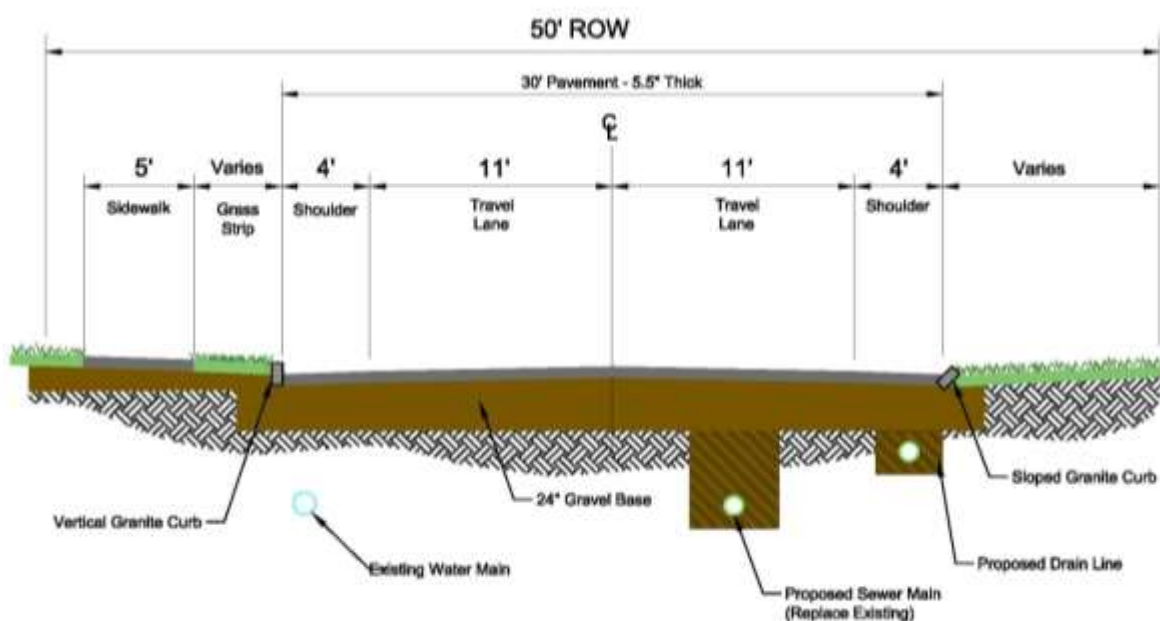
- Traffic travels at high speeds, making operating conditions unsafe for vehicles and pedestrians
- Towle Farm Road approach is steep, making it difficult to accelerate and enter the Exeter Road traffic stream, especially for large trucks
- Sight lines obstructed at some intersections
- Sewer TV Inspection: VC pipe, several sags, cracks, and many leaking joints



We have begun to address these issues in our preliminary design.

To improve operating conditions for vehicles and pedestrians, we propose a roadway section (see figure below) with 11 foot travel lanes, 4' shoulders, and replacement and rehabilitation of the bituminous sidewalk. The 4' shoulder would greatly

improve the safety and comfort for cyclists. The sidewalk upgrades would provide a continuous improved surface for pedestrians that meets ADA requirements and provides better and safer connections to the south side of the road. Connections across the road would be improved with additional crosswalks at key locations with special treatments (traffic calming elements) to enhance visibility and safety, and slow traffic speeds at these locations.



Proposed Typical Section

At the Towle Farm Road intersection, we have reviewed options to flatten the grade of this approach. The existing steep approach makes it difficult and unsafe for trucks to enter the traffic stream. The intersection is constrained by existing features, but minor adjustment can be made to both the profile and geometry that would improve the functionality of the intersection.

All subsurface utility work should be done prior to roadway reconstruction to limit future trench cuts/repairs in newly constructed road. We have contacted Aquarion Water and they asserted that their water main in this section of roadway has substantial remaining service life and does not need to be replaced. Until confirmed their gas main has significant remaining service life also.

The Town's sewer collection mains extends through most of the project area. The sewer mains are mostly 8" vitrified clay (VC) pipes, which are prone to infiltration and long-term failure. We video inspected the entire sewer main to assess its condition and confirmed it is in poor conditions, with sags, several breaks, root intrusion and leaking joints (see pictures at right). We propose replacing the sewer main with modern pipe types (PVC) and construction details that will serve the area for decades.

We have evaluated different life-cycle cost scenarios to determine the most cost effective construction strategy. Based on recommended construction approach described above, we prepared an opinion of probable cost:

- \$4,000,000 – Construction
- \$800,000 – Engineer Design/Permitting/Const Administration
- \$1,000,000 – Misc. Const/2016 inflation/Contingency
- **\$5,800,000 – Total**

As shown, the costs are itemized in 2014 dollars for construction, engineering design, permitting, and construction administration. The contingency line item accounts for inflation costs (construction likely would not start until 2016); miscellaneous construction items that will be determined during final design; and general contingency to account for unforeseen events and circumstances during construction. The roadway reconstruction (base gravels and pavement; without drainage and other improvements) is about \$1.2 million, but doing this work without addressing the drainage and other issues has limited long term benefit.

